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problems, the council goes on to say that other machinery and additional state assistance are absolutely necessary for the purpose. But it needed the shock of the war to make this manifest. The council decided first of all to save as many as possible of the researches which were being conducted before the war and were in danger of abandonment, and recommended the payment of a series of grants. They also have under consideration the possibility of inducing firms in at least some of the industries to assist the progress of research by informing them in confidence of the problems they have in hand or in contemplation. The universities, it is contended, can and must be the main sources of research in pure science, the discoveries in which lie at the root of all practical and technical applications. But they will not be able to do their fair share unless they can attract more students and larger funds.

President Wilson in appointing the advisory board remarks: ''In the present instance, the time of some of the members of the advisory board could not be purchased. They serve the government without remuneration, efficiency being their sole object and Americanism their only motive.'' It may, however, be questioned whether service without remuneration promotes efficiency. The English committee of the Privy Council is doubly amateurish, not consisting of scientific men and not being paid. This may be in accord with aristocratic traditions, but in a democracy men should be paid the value of their services. Advice given without charge and without responsibility is usually worth no more than it costs.

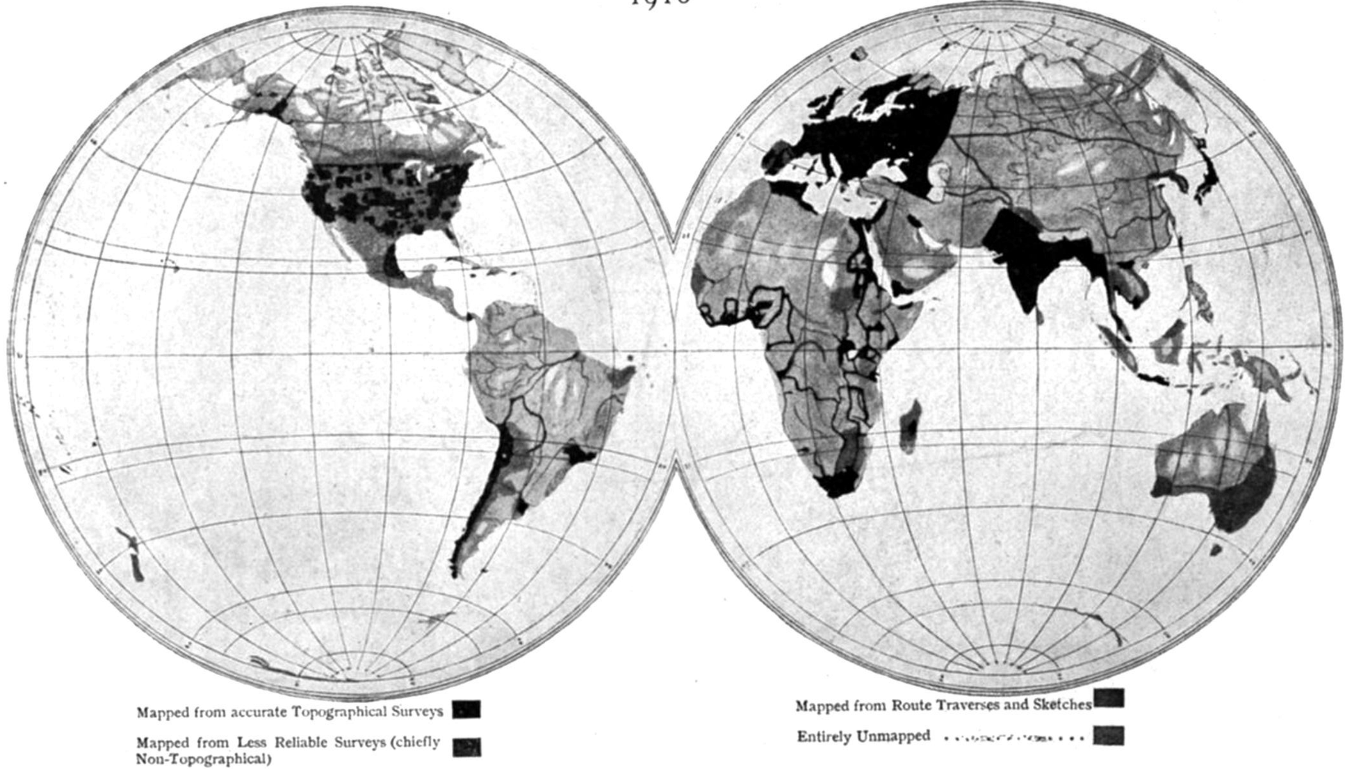
But these various advisory scientific and industrial commissions are important as indicating an awakening of public interest to the place of science under the government. It may be that in due time the scientific and expert functions of the government will be recognized as coordinate with its legislature, executive and judicial departments. A supreme court to interpret the ''laws of nature'' is not required, but we do need a paid board of scientific men, as far removed from prejudice and politics as the justices of the supreme court should be, and as expert in science as they are in the law, whose decision on questions of scientific policy and scientific appointments should be final within the limits of the laws and the appropriations passed by the congress.

PROGRESS IN THE MAPPING OF THE EARTH

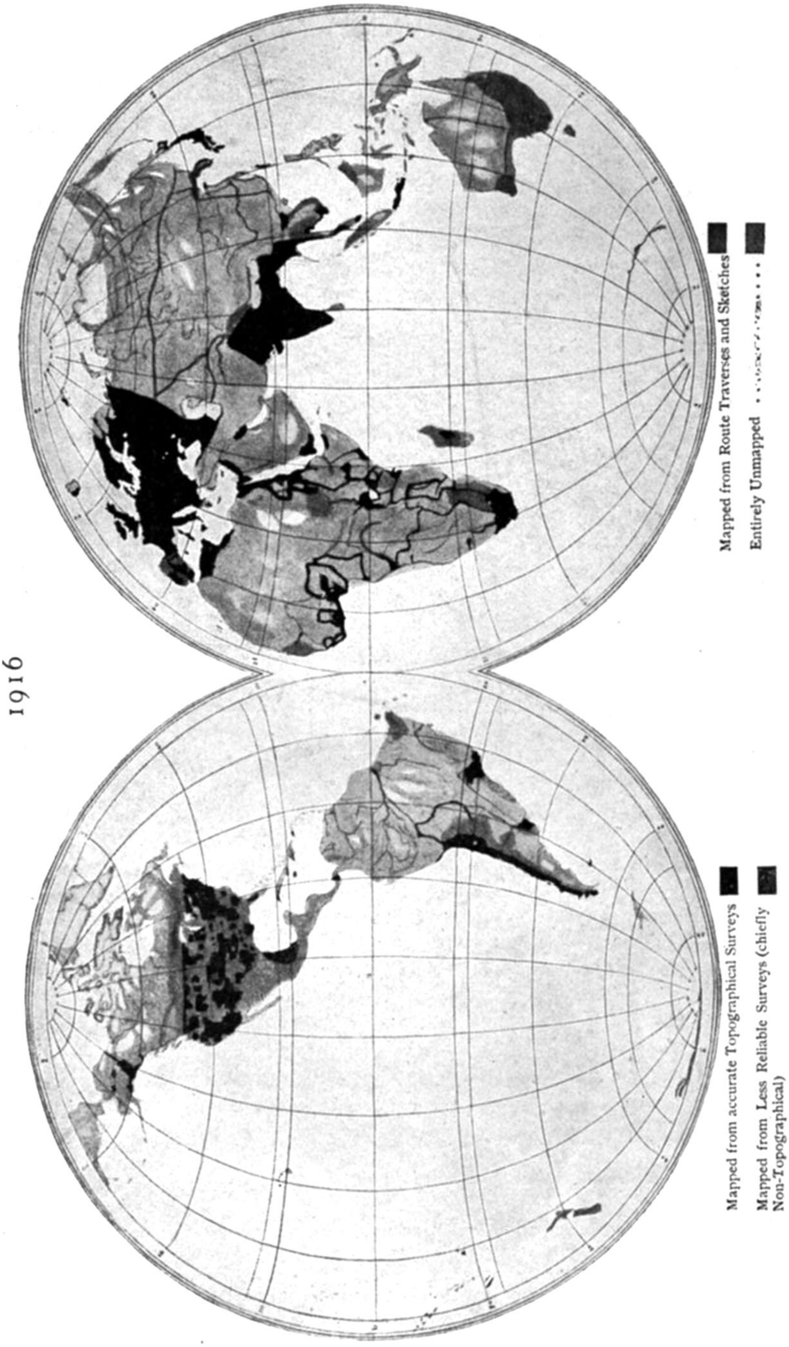
In his presidential address before the Geographical Section at the recent meeting of the British Association for the Advancement of Science Mr. Edward A. Reeves described the progress that has been made in surveying and mapping the earth since 1880, and there are here reproduced two maps which were presented at the meeting.

The maps are drawn on an equal area projection, that is to say, a certain area on the map, such as a square inch, everywhere represents the same area on the earth's surface. The idea kept in view in drawing the maps is that the shade deepens as the accuracy of the surveys increases. (1) The parts that are topographically mapped from triangulation or rigorous traverses are shown by the darkest tint; (2) those that are less accurately mapped from surveys chiefly non-topographical, and of which in many places the basis consists to a great extent of disconnected land-office and property plans, are shown by the tint next in density; and then the next lightest tint (3) represents the parts of the world that are only mapped from route-surveys or rough traverses of explorers. Although these traverses vary greatly in degree of accuracy, they can not be considered so reliable as the surveys shown by either of the other two shades, and in many cases the mapping consists of the roughest sketches. (4) The regions that are entirely unsurveyed and unmapped are indicated by the lightest tint of all, almost white.

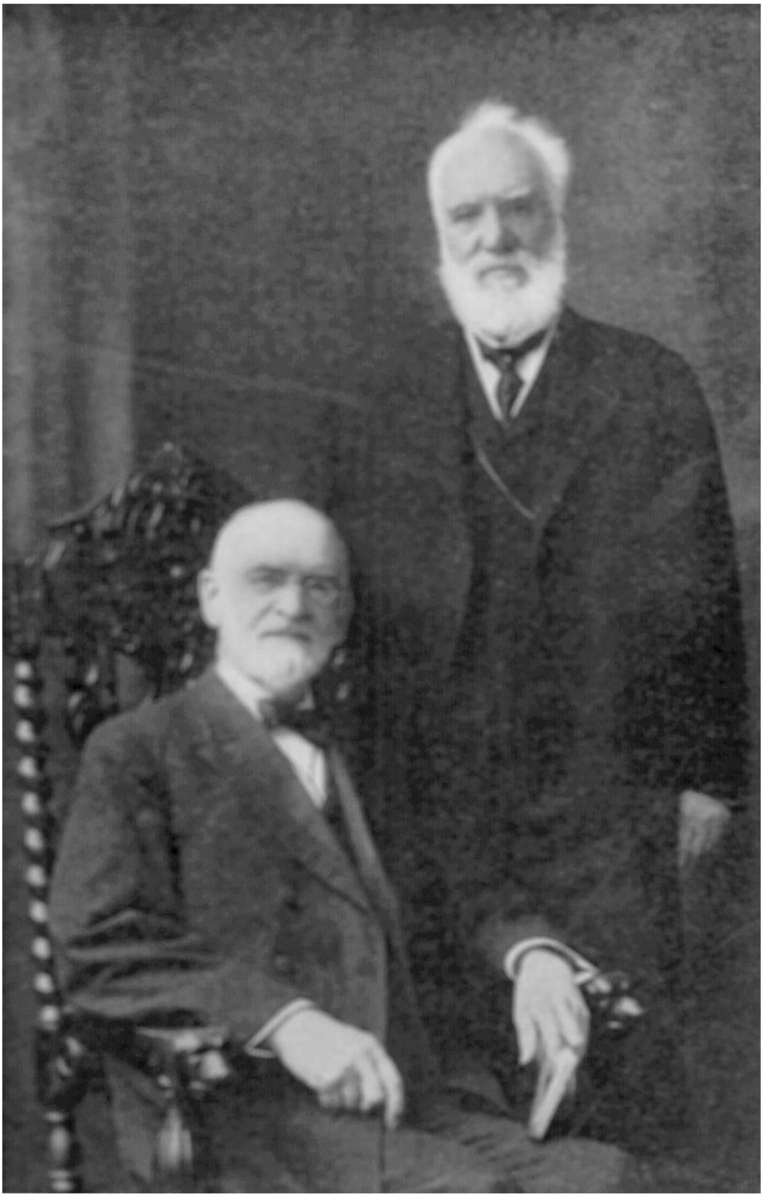
Referring to the state of surveys in the Eastern Hemisphere in 1860, it will be seen that outside the continent of


Mapped from accurate Topographical Surveys ■
Mapped from Less Reliable Surveys (chiefly Non-Topographical) ■
Mapped from Route Traverses and Sketches ■
Entirely Unmapped ■

MAP OF THE EARTH. Surveys in 1860.


1916
Mapped from accurate Topographical Surveys ■
Mapped from Less Reliable Surveys (chiefly Non-Topographical) ▨
Mapped from Route Traverses and Sketches ■
Entirely Unmapped . . . . ▨

MAP OF THE EARTH. Surveys in 1916.



Courtesy of Bostonia.

ALEXANDER GRAHAM BELL AND WILLIAM FAIRFIELD WARREN.

Dr. Bell (who is shown standing) was professor of the mechanism of speech in the School of Oratory of Boston University from 1874 to 1879, while Dr. Warren was president of the university. Dr. Warren in his annual reports makes frequent reference to Dr. Bell's discovery and perfection of the telephone in 1875 and 1876. In 1878 Dr. Bell was invited to lecture at Oxford, and in his next annual report Dr. Warren says that " this is the actual initiation of a practice of international academic exchange which is destined to grow into proportions of the highest import."

Europe, where a considerable extent of accurate surveying had been carried out, the only country where any mapping, based upon triangulation, had been done was India. These areas are shown in the darkest shading. In Europe, France, British Isles, Germany, Austria, Italy, Russia, Switzerland, Denmark, the Netherlands, and Scandinavia had already made a good commencement with their government maps based upon trigonometrical surveys, but these were in several cases by no means complete. India has been noted for the excellency of its surveys ever since the days of Major Lambton, who started the work in 1804, and Colonel Everest, who succeeded him as head of the surveys after Lambton's death in 1823.

In the parts of the Eastern Hemisphere that were surveyed and mapped in the second degree of accuracy, that is, those shown by the next tint, may be included most of the remaining parts of Europe, Egypt, and parts of Algeria near the coast. For the rest such mapping as was done was based upon rough route-sketches, shown by the third tint. In this must be included practically all that was known of the African continent, such as the explorations of Mungo Park, Beke, Livingstone, Speke and Grant, and others, as well as the early exploratory surveys in Central Asia and Australia. The regions that were entirely unsurveyed and unmapped at this time were enormous in their extent, and included not only the Polar regions, but vast areas of Central Africa, Asia and Australia.

Turning to the Western Hemisphere, we find that at this date no triangulation of any extent had been carried out. The U. S. Coast and Geodetic Survey had made a good start, but their work had been confined to the coastline or districts near the coast. There had been La Condamine's attempt at measuring an arc of the meridian near Quito in South America in 1736, the measurement of the Mason and Dixon line, and their survey of the boundary between Pennsylvania and Maryland, in the latter part of the same century; but neither of these resulted in any serious topographical mapping. Such surveys as existed of the interior parts of the United States in 1860, although they varied as regards their merits and degree of dependence, could not be considered as anything but approximate. Some parts of the eastern states are shaded with a tint of the second density, but, with this exception, such mapping as had been done either in North or South America can not be considered of a higher order than route-traversing and sketching, and is tinted accordingly.

Referring now to the 1916 map on which the same shades of tints have the same meaning as on the previous map, the parts that are accurately surveyed from a topographical point of view, based upon triangulation or rigorous traverses, have greatly increased in extent, and these now represent about one seventh of the total area of the land-surface of the earth, instead of only one thirtieth, as was the case in 1860. Remarkable progress has also been made with regard to both of the less accurate kinds of surveying and mapping, while

	1860		1916	
	Sq. Stat. Miles	Proportion to Whole	Sq. Stat. Miles	Proportion to Whole
Mapped from accurate topographical surveys based on triangulation or rigorous traverses	1,957,755	= 0.0326 or roughly 1/30	8,897,238	= 0.1482 or roughly 1/7
Mapped from less reliable surveys, chiefly non-topographical	2,017,641	= 0.0336 or roughly 1/30	5,178,008	= 0.0866 or just over 1/12
Mapped from route traverses and sketches	25,024,360	= 0.4170 or roughly 2/5	37,550,552	= 0.6258 or little less than 2/3
Entirely unsurveyed and unmapped	30,997,054	= 0.5166 or just over 1/2	8,350,794	= 0.1391 or little less than 1/7

the parts that are now entirely unsurveyed and unmapped only amount to about one seventh instead of a little over one half, which was roughly the amount in 1860.

An estimate of the condition of the world's surveys as represented by the differently tinted areas on the maps for 1860 and 1916, taking the total area of the land-surface of the earth together with the unknown parts of the Arctic and Antarctic regions which may be either land or water, to be 60,000,000 square miles, gives in square miles the results shown on page 519.

SCIENTIFIC ITEMS

We record with regret the death of Professor Charles Smith Prosser, head of the department of geology of the Ohio State University; of Dr. Joseph Hoeing Kastle, director of the experiment station of the University of Kentucky; of Dr. LeRoy Clark Cooley, emeritus professor of physics at Vassar College; of Professor Levi Leonard Conant, head of the department of mathematics at the Worcester Polytechnic Institute; of Sir T. Lauder Brunton, F.R.S., distinguished for his work in pharmacology; of Dr. V. von Czerny, professor of surgery at Heidelberg, and of Don José Echegaray, professor of mathematical physics at Madrid, distinguished also as a poet and dramatic author.

Sir Charles Parsons, the engineer, has been elected president of the British Association for the meeting to be held at Bournemouth in September next.

By vote of the board of trustees a bronze bust of Professor Thomas Chrowder Chamberlin will be placed immediately in Rosenwald Hall, University of Chicago, thus recognizing his long service to the university. Dr. Chamberlin has been professor and head of the department of geology since resigning the presidency of Wisconsin University in 1892.

Under the will of Eckley Brinton Coxe, Jr., late president of the University of Pennsylvania Museum, the university was bequeathed the sum of $500,000 as an endowment fund for the maintenance of the museum, its publications and expeditions. He also bequeathed the sum of $100,000 to the university, the income of which is to be used towards increasing the salaries of professors.

Seth Low, president of Columbia University from 1890 to 1901, and trustee from 1881 to 1914, by his will, bequeathed $15,000 to a cousin and $12,000 to the daughter of his former nurse, half of these sums to go to Columbia University on their deaths. On the death of Mrs Low several educational bequests became effective. Canton Christian College will receive about $70,000, the University of Virginia, Berea College and the Tuskegee Normal and Industrial Institute will each receive about $50,000. Mr. Low gave large gifts to Columbia University during his presidency, including the sum of $1,200,000 for the erection of the library building in memory of his father.